Important Advances in Clinical Medicine

Epitomes of Progress—Radiology

The Scientific Board of the California Medical Association presents the following inventory of items of progress in radiology. Each item, in the judgment of a panel of knowledgeable physicians, has recently become reasonably firmly established, both as to scientific fact and important clinical significance. The items are presented in simple epitome and an authoritative reference, both to the item itself and to the subject as a whole, is generally given for those who may be unfamiliar with a particular item. The purpose is to assist the busy practitioner, student, research worker or scholar to stay abreast of these items of progress in radiology which have recently achieved a substantial degree of authoritative acceptance, whether in his own field of special interest or another.

The items of progress listed below were selected by the Advisory Panel to the Section on Radiology of the California Medical Association and the summaries were prepared under its direction.

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Cholescintigraphy: Hepatobiliary Imaging With IDA Derivatives Labeled With Technetium 99m

A NEW GROUP of radioactive pharmaceutical agents for hepatobiliary imaging are the N-substituted iminodiacetic acid (IDA) derivatives labeled with technetium, which were first synthesized and reported in 1975. These compounds are structurally related to lidocaine and, when reacted with technetium 99m, show good extraction by the liver and rapid excretion into the bile. Several IDA derivaties (such as HIDA [dimethyl-IDA], PIPIDA [para-isopropyl-IDA] and diethyl-IDA) are now in use for diagnostic imaging.

The normal time sequence of an IDA scan depends somewhat on the specific product used but may be generalized as follows: After intravenous injection of 5 to 10 mCi of the agent in a human who has fasted for 2 to 12 hours, an immediate *blood-pool phase* is seen during the first 30 to 60 seconds. By three to five minutes blood clearance is almost complete and the *early hepatic parenchymal phase* has peaked. The *renal excretory phase* occurs from about 15 to 30 minutes after injection. *Bile ducts* are seen best from about 10 to 20 minutes after injection, and the descending portion of the *duodenum* may be seen from about 20 to 30 minutes. The *gallbladder phase* occurs from 13 to 60 minutes postinjection in adequately fasted, normal patients; however, if the patient has *not* fasted before examination, gallbladder exclusion has been described and may result in a falsely abnormal study. A routine study includes views of the liver and biliary tree area at 1, 5, 15, 30, 45 and 60 minutes. Computer acquisition and processing of images are not usually necessary, unless gallbladder emptying in response to cholecystokinin is to be studied. If an abnormal result is apparent within the first hour, it may be necessary to continue intermittent imaging for two to five hours following injection and, possibly, a 24-hour delayed view may help to detect presence of any bowel activity.

Clinical indications for hepatobiliary imaging include the following: (1) The differential diagnosis of obstructive jaundice; (2) diagnosis of biliary atresia in infants; (3) evaluation of biliary drainage pathways and intestinal bile flow postoperatively and determining the presence of biliary reflux; (4) assessment of hepatobiliary structure and function in cold areas on the technetium 99m sulfur colloid (liver and spleen) scan, and (5) determination of cystic-duct patency in cases of suspected acute cholecystitis.

The success of the IDA derivatives in the dif-